ALBERTA HERITAGE FOUNDATION FOR MEDICAL RESEARCH

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SPRING 2001

ARE WE BEATING CANCER?

research news

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Regular features

Research Views featuring Dr. Gregg Bloche 1

Researchers in the making 20

Reader resources 21

Back page featuring
AHFMR 2001 Senior Personnel Awards 22

AHFMR Mission

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With both a medical degree and a law degree, Gregg Bloche is a Professor of Law at Georgetown University in Washington, D.C., and Co-director of the Georgetown/Johns Hopkins Joint Program in Law and Public Health. He is an internationally recognized authority on medical ethics.

After the fall of apartheid in South Africa, the Truth and Reconciliation Commission (TRC) offered a unique and time-limited opportunity for those who had participated in the apartheid regime to come forward, apologize for their actions, and avoid prosecution. The program also enabled victims to forgive perpetrators of apartheid. The TRC invited a delegation organized by the Committee on Scientific Freedom and Responsibility (part of the American Association for the Advancement of Science) to consult on the Commission's report concerning the involvement of the health sector in the apartheid regime. During apartheid, certain of the worst human rights abuses were carried out with the active participation of doctors and other healthcare professionals.

Dr. Bloche was a member of that delegation which travelled to South Africa in June 1997. Early in 2001, he was in Edmonton for a medical ethics forum and presented a public lecture reflecting on the experience of the South Africa delegation.

Dr. Bloche pointed out that underlying the rampant human rights abuses during the apartheid regime—the most famous case being the murder of medical student and activist Steve Biko—was the complicity of health institutions and professionals in perpetuating institutionalized medical apartheid. Black medical students were not permitted to treat White patients (unless the patients were unconscious) or to dissect White cadavers. Hospitals were segregated. The healthcare system was designed so that Blacks were treated differently than Whites, with inferior allocations of resources to the Black population.

The healthcare system was designed so that Blacks were treated differently than Whites.

In addressing these issues, the Truth and Reconciliation Committee (TRC) developed a new bioethical framework based on four main themes, which Dr. Bloche summarized: First, healthcare professionals must oppose discrimination. Second, government disbursement of healthcare funds must be equalized to all populations while respecting cultural differences. Third, it must be recognized that physicians with dual loyalties—to institutions as well as to patients—are often more vulnerable to coercion. (In South Africa, a whole arm of the military was composed of health-care professionals.) The challenge of resolving multiple loyalties is central to the World Health Organization's international code of medical ethics.

Finally, the Report criticized South African healthcare institutions for failing to take action against the divisive effects of apartheid on society. Dr. Bloche emphasized that this last point differs from traditional bioethics thinking, which focuses on the individual physician and patient. The emerging notion of social capital echoes this new theme:

Page 2 ▸

suppressed populations at the bottom rung of society experience a great variety of life stressors, including lack of education and inability to earn a living which link to ill health.

What can the global community strive for in the wake of the TRC? The first step is the acceptance that there is a dynamic relationship between health status and health care. There must be minimum standards for health care, allowing for cultural and national differences, and there must be equal distribution of food. Pharmaceutical companies must be obliged to provide developing countries with drugs, otherwise unaffordable, to combat diseases such as AIDS. There must be limits on physicians' dual loyalties, and minimum standards worldwide to guarantee that physicians abstain from participation in such heinous practices as torture and female genital mutilation.

The first step is the acceptance that there is a dynamic relationship between health status and health care.

Dr. Bloche added that even the way medical students are taught should be examined. Obedience to authority is expected. However, problems can arise when physicians are out in the world—not in a system of professionals but in a bureaucracy, particularly a military and state-security bureaucracy skilled at inculcating skepticism and dissociation. An example of this can be found in the medical terminology of Nazi Germany, which referred to "excising the cancer of the Jews from the body politic".

The Truth and Reconciliation Commission was more than a gesture of "let bygones be bygones." In Dr. Bloche's words, "It was a political and spiritual transformation, which was an outgrowth from an indigenous process of African tradition and from the British tradition of legalism." When asked if the mechanism of the TRC has global applicability, Dr. Bloche replied, "It's unlikely such a process could happen anywhere else in the world, largely because Desmond Tutu and Nelson Mandela had the moral authority to guide the process successfully." However, we can be inspired and guided by the TRC's outcomes.

Understanding the frustration of fatigue

It's invisible, and there's no way to measure it objectively. Yet fatigue can disrupt a person's life as surely as the most devastating illness. In her work as a cancer nurse, Dr. Karin Olson has seen fatigue's debilitating effects first-hand.

"People who have cancer speak about tiredness in such a way that you know they're more than 'just tired'," she says. "They talk about being too tired to sleep. They say their tiredness makes it difficult to think and communicate. Researchers report that cancer patients often find fatigue more distressing than pain.

"I began to wonder how different this fatigue is from ordinary tiredness. Who experiences it? Is fatigue the same in people who are ill and those who aren't?"

Questions like these were the inspiration for a study led by Dr. Olson, who works at the University of Alberta's International Institute for Qualitative Methodology. Her research team is undertaking a study of fatigue in seven groups: shift workers; elite athletes; individuals experiencing job stress; those with chronic fatigue syndrome (CFS), depression, or cancer; and those receiving palliative care.

"We believe we can learn more about the unique features of fatigue by comparing it among these different groups," explains Dr. Olson. "We need to have a better conceptual understanding of fatigue in order to design ways to help people suffering from fatigue."

The team has started with two groups: shift workers and individuals with CFS. Their first step was a concept analysis, which identified the attributes and manifestations of fatigue. A series of in-depth interviews is now underway.

The concept analysis has added support to their hypothesis that fatigue is a failure to adapt to stress. "We believe that fatigue is really one of three distinct states, which are all a response to stressors such as illness or an emotional upset," says Dr. Olson.

The first state is tiredness. Individuals who can adapt to the stress won't feel tired anymore. If they don't adapt, tiredness can progress to the second stage, exhaustion. And if there's no adaptation at this point, exhaustion will turn to fatigue. "This third state is extremely serious and very difficult to recover from," notes Dr. Olson. "The fatigue response is both conscious and unconscious. It takes energy to adapt to a stress, and a fatigued individual simply does not have the energy.

"It's important to understand that this is a work in progress. As our research progresses, we may find that some of our assumptions are wrong. So at every step, we test our working model against the data. We ask: Does this still make sense?

"We're at the same point with fatigue as we were with pain about 10 years ago. At that time, we began to pay attention to what people were saying about their pain. We learned a lot, and we're still learning. As a result, we can now control and manage pain more successfully. We need to do the same kind of research on fatigue."

Dr. Karin Olson is an AHFMR Health Research Career Renewal award recipient. Her work is also supported by a Social Sciences Research Operating Grant from the University of Alberta.

Recent publications:

Porock D, Kristjanson L, Tinnelly K, Duke T, Blight J. An exercise intervention for advanced cancer patients experiencing fatigue: a pilot study. *Journal of Palliative Care* 2000; 16(3): 30-36.

Lloyd A, Hickie I, Peterson P. Chronic fatigue syndrome: current concepts of pathogenesis and treatment. *Current clinical topics in infectious diseases* 1999; 19: 135-159.

Helping seniors keep healthy

Seniors take more pills than younger people. *That's not surprising, given their age and the likelihood of their having multiple chronic illnesses, but it puts them at greater risk for serious complications from inappropriate use of prescription and non-prescription drugs. Until now, healthcare providers haven't had a practical and reliable way of determining what medications the elderly are taking, and how they're taking them, in various settings from hospital to home to institution. Nor have caregivers been able to link information on drug use, adherence, and under-utilization with standardized clinical data on seniors' healthcare needs–regardless of the care setting.*

Dr. Colleen Maxwell, a Heritage Population Health Investigator, is leading a study evaluating a powerful care-needs assessment tool for Alberta's continuing-care system. This tool, called the Resident Assessment Instrument for Home Care (RAI-HC) promises to improve both appropriate drug use and timely intervention in cases where people aren't taking their drugs or are taking them improperly. "This is the first time, with this instrument, that we have clinical data linking with drug data, to allow us to evaluate and measure a diverse range of health issues among Canadian seniors," says Dr. Maxwell, an Assistant Professor in the Departments of Community Health Sciences and Medicine at the University of Calgary.

The study began last year in the Calgary and Chinook health regions. It involves a total of 330 home-care clients aged 65 and over. Half of the participants live in an urban setting; half in a rural one. The RAI-HC is also expected to help improve the standard of health care, its delivery to seniors, and their overall quality of life, Dr. Maxwell says. "For the first time ever in Canada, we're going to be able to answer questions about the care needs of older patients in different settings, throughout the continuum of care."

The Resident Assessment Instrument for Home Care, is part of a family of clinical instruments developed by interRAI, a group of researchers and clinicians in 20 countries. The first of the instruments, RAI 2.0, for use in continuing-care facilities, has undergone 10 years of testing in the United States. Now, both the home-care and facility-care instruments are being introduced and evaluated in Alberta and across Canada.

"This is a comprehensive and integrated approach to clinical assessment across the continuum of care, so that you can have timely interventions and seamless delivery of care," Dr. Maxwell says. The family of instruments is more standardized than previous assessment methods and has been extensively evaluated and supported by research, says Dr. David Hogan, a geriatric medicine specialist at the University of Calgary. "The major hope is that individuals would have a standardized, reliable evaluation that would also be comprehensive whether they're in a continuing-care facility or in their own homes."

The instrument, linked with effective interventions, should help improve communication among care providers, Dr. Hogan says. Community-based caregivers, for example, need accurate and timely information to ensure elderly heart-disease patients take their medications properly, so that they avoid re-hospitalization or complications. "If we've got a

TOP RIGHT: DR. COLLEEN MAXWELL

Dr. Colleen Maxwell is using a powerful care-needs assessment tool to address a diverse range of health issues among Canadian seniors.

standardized assessment that can follow those patients from acute to home to wherever they are, then the providers have the information they need to target their intervention," Dr. Maxwell says.

The design of the assessment flags potential problem areas and instantly generates a care plan based on best practices. Health-care providers can also compare the quality of their home-care programs and continuing-care facilities with others across Canada and around the world.

Health policy-makers like the tool because they need a rigorous, standardized method to determine community-based health-care needs for the purpose of allocating appropriate funding. Home-care nurses participating in the 18-month study are using the tool to gather data on clients' physical status, mental functioning, drug use, health care needs, and caregiver support and strain. Data on healthcare utilization and outcomes will be gathered after 12 months.

The comprehensive assessment highlights health-promotion issues, such as excessive alcohol use and social isolation, that could be more effectively addressed with seniors in home care, Dr. Maxwell notes. For her research focus, the assessment captures information not only about seniors' prescription drug use, but about their use of off-the-shelf drugs, including alternative products such as herbs and other supplements. The data will facilitate better understanding of the potential risks of interaction between prescription and non-prescription drugs and supplements.

The study has found that an unexpectedly high number of home-care clients are receiving help with taking their medications properly, whether from nurses, family, friends, or pharmacies. A worrisome finding is that seniors often mix and share their medications, including drugs past their expiry date, with spouses and neighbours.

Dr. Maxwell is investigating the reasons why people don't take their drugs (non-adherence)—such as multiple prescription providers or access to a physician—as well as the most effective way of screening for non-adherence, and which clients might be at greatest risk. She will compare her clinical data with such health outcomes as worsening cognitive and physical status, re-hospitalization, physician and emergency-room visits, and mortality.

Drug non-adherence is a problem among seniors and young people alike, Dr. Hogan notes. "Colleen's study will allow us to look at what the situation is, at least in Alberta, comparing rural and urban areas," which could help target one or more groups for more effective intervention.

Dr. Maxwell, a fellow with the Institute of Health Economics, will lead a separate tri-regional study to evaluate the interRAI tool in continuing-care facilities in the Calgary, Capital, and Chinook health regions.

Dr. Maxwell has been involved primarily with seniors' health since 1989, when she received a master's degree in gerontology at the University of Waterloo. Working full-time in a chronic-care hospital in Ontario highlighted for her the need for more

Page 6 ▸

Healthy seniors

▸ research into seniors' health issues, better understanding of appropriate intervention, and health promotion for the elderly. She credits her master's thesis supervisor and first employer, Dr. John Hirdes at the University of Waterloo, the only Canadian member of the interRAI group, with having been a significant influence in her career choice. She moved to Calgary for the opportunity to collaborate with Dr. Hogan, a top Canadian expert in dementia.

Seniors' health issues deserve the same level of attention, research, and funding as such other fields as cardiovascular disease or cancer research, Dr. Maxwell says. "So much of what we talk about in terms of health and disease in Canada are seniors' issues."

Dr. Maxwell is an AHFMR Population Health Investigator. She also receives funding from the Institute of Health Economics, The Merck Company Foundation, and the Calgary and Chinook health regions. Dr. David Hogan received support from the Health Research Fund, administered by AHFMR on behalf of Alberta Health and Wellness. Dr. Hogan is a Professor and the Brenda Strafford Chair in Geriatric Medicine in the Faculty of Medicine at the University of Calgary.

Recent publications:

Saunders LD, Alibhai A, Hogan DB, Maxwell CJ, Quan H, Johnson D. Trends in the utilization of health services by seniors in Alberta. *Canadian Journal on Aging*. In press.

Maxwell CJ, Hogan DB, Hirdes JP. The prevalence and treatment of hypertension in long term care settings: implications for quality of care of the frail elderly. *Annals of Long-Term Care: Clinical Care and Aging* 2000; 8(11): 31-36.

Neutel CI, Maxwell CJ. Medication and the risk of falls. *Pharmacoepidemiology and Drug Safety*, 2001. Submitted.

Taking the measure of women's health at *midlife*

In her research, Dr. Meadows has discovered that those "little things" are a critical part of the big picture of women's health. "What we have learned about factors that are influential in women's health helps us begin to talk about the difference between health—which is seen as being a very physical thing—and well-being, which is much more holistic," she says. "Women talk about their well-being as being holistic. It isn't just physical. It's also emotional, spiritual, cultural, sometimes financial. My work is aimed at understanding how having certain life experiences or socio-cultural characteristics affects women's well-being and the processes through which this occurs."

Dr. Meadows sees her work as "giving voice to the experiences and perspectives of midlife women about their health and well-being." As she says, "It's very important that we have important research on various diseases through biomedical and epidemiological research. However, it is equally important that we understand the social and cultural context in which women and their physicians and other health professionals understand and operate on that information. It's important that we understand what's happening on the ground, what qualitative researchers call 'local causality.'"

Dr. Meadows became interested in women's health when she was working with the Alberta Primary Health Care Research Unit in the mid-1990s. Her research soon focused on women at midlife. She realized that the studies on midlife women's health were rare—and that what research did exist on middle-aged women's health was almost exclusively concerned with reproductive health. In other words, women between the ages of 40 and 65 were often given short shrift.

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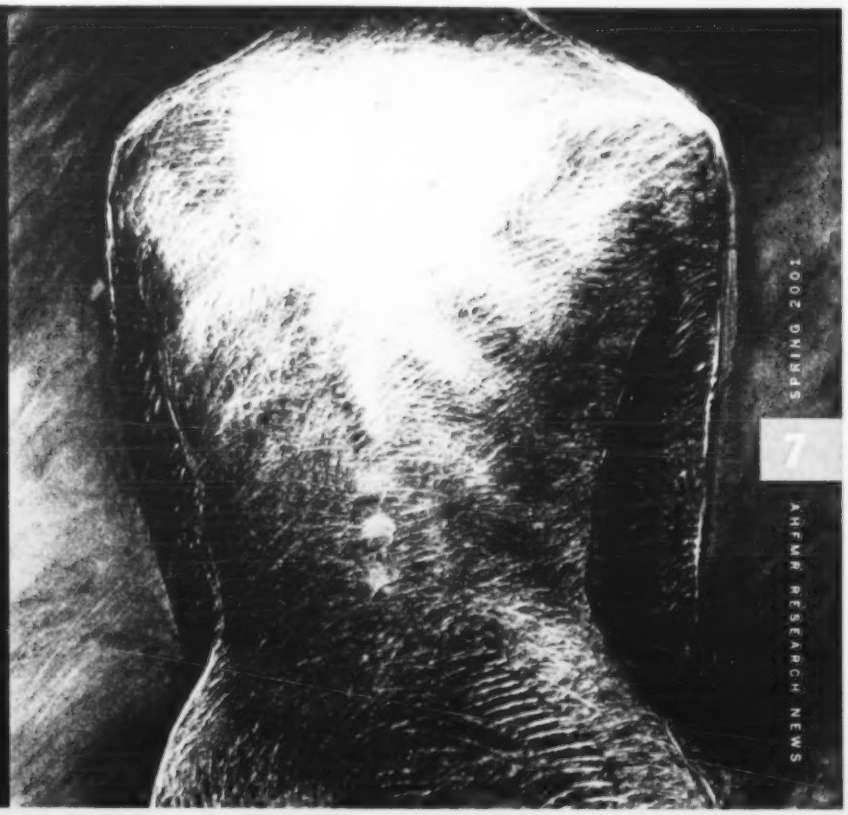
"Get out of here! You're the healthiest person I've seen in months!"

The well-meaning physician who utters these words to a middle-aged female patient probably isn't thinking about how they will be interpreted. "They send a very strong message that the system is too busy to be bothered by 'little things' and that you have to have a big problem to be taken seriously," says AHFMR Population Health Investigator Dr. Lynn Meadows. "That's a very silencing message."



"Because much of the research was quantitative in nature, gathering and working with statistics, it struck me that researchers know lots about the dots, but they don't know very much about connecting them," she says. "I wanted to do something in my research that focused on an area that needed attention. It didn't hurt that I am part of that population!"

Dr. Meadows has been listening to middle-aged women's stories since she became one of the Heritage Foundation's first Population Health Investigators in 1996, adding a dimension of qualitative research to the broad menu of research that is supported by AHFMR. Her first study focused on urban, middle-class, Euro-Canadian women. Subsequent studies have involved groups of rural women, developmentally disabled women, aboriginal women, and immigrant women. But the lesson she learned from her first group is one that she has carried over into all her subsequent work: communication is one of the key issues in women's health and well-being. Women need to feel that their health concerns are being heard.

My work is aimed at understanding how having certain life experiences or socio-cultural characteristics affects women's well-being and the processes through which this occurs.

"All the groups have expressed frustration about being heard when talking with health professionals," she says. "One would think that these middle-class Euro-Canadian women are among the most privileged women in our society. So it was very striking to me that they have so much to say about their own health and well-being. That means there's a lot to be heard from women who aren't in a position to be asked, or who don't feel comfortable sharing that information."

In the safe environment of focus groups, the aboriginal women talked about the threat of diabetes, the loss of culture, the frustration of dealing with non-aboriginal physicians, and the challenge of developing parenting skills when they have grown up without strong parental role models. Immigrant women told her about the difficulties they face adapting to a new culture, their focus on families as the unit of well-being, and the role that spirituality continues to play in their well-being. Developmentally disabled women expressed their frustration at a busy health-care system that either rushes them or assumes that they don't understand. Rural women described the connection between their physical environment and their well-being.

Dr. Meadows says her early work with the aboriginal women, for example, suggested they need a place to go where they can talk to one another and

Page 8 ▸

DR. LYNN MEADOWS

"Women talk about their well-being as being holistic. It isn't just physical. It's also emotional, spiritual, cultural, sometimes financial."

share their knowledge and experiences. Members of one of the focus groups she started have continued to meet in an informal support group, calling themselves the Taking Care of Ourselves group. "They wanted to meet even when we weren't talking with them anymore," she says. "That was a real, practical, and very exciting outcome of our work."

She is keen to follow up on other issues that have been brought up in the study groups, such as dissatisfaction with paid work—a significant problem among the urban women—and the stress involved in juggling multiple roles. Her work thus far has involved collaborative projects with a number of colleagues, including Dr. Billie Thurston from the University of Calgary's Department of Community Health Sciences, and Olga Szafran of the Department of Family Medicine at the University of Alberta.

In a current collaborative project with orthopedic surgeon Dr. Linda Mrkonjic, being conducted in co-operation with the Osteoporosis Clinic at Grace Women's Health Centre, she is looking at bone-health issues of mid-life women who suffer a fracture. "What does it mean to a 43-year-old woman who has fractured her arm?" she wonders. "Does she think it's just because she slipped and fell? Or does she start to worry about osteoporosis?" Along with Dr. David Hanley, Director of the Osteoporosis Centre, and the OOPS (Orthopedic Osteoporosis Pilot Study) Working Group, which includes members from family medicine, nursing, rheumatology, internal medicine, orthopedic surgery, and sociology, Dr. Meadows is conducting research to determine whether a fracture in middle-age triggers any questions about the woman's bone health.

Dr. Meadows says that being a sociologist researching women's health and well-being in a medical environment gives her an advantage, in that she views the issue from a social science perspective. She asks questions that women are unlikely to be asked in a medical environment: questions about the role that social institutions such as family, employment structures, government, and the health-care system play in women's health. And she continues to be fascinated by the women's answers.

"I think there's a lot going on in women's lives between 40 and 65," she says. "That's why I named my study WHEALTH: The Alberta Midlife Women's Health Project. Because to me, if you have your health, you have everything. And women are a wealth of information about themselves. I really wanted to contribute to what we know about ourselves and our lives, so that we can work in partnership with laypersons and professionals to foster the well-being of midlife women."

Dr. Lynn Meadows is a Heritage Population Health Investigator who has also received support from the Health Research Fund administered by AHFMR on behalf of Alberta Health and Wellness. Dr. Meadows is an Assistant Professor in the Department of Family Medicine in the Faculty of Medicine at the University of Calgary.

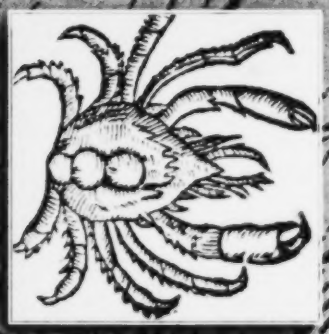
Recent publications:

Meadows LM, Thurston WE, and Berenson C. Health promotion and prevention: interpreting messages at midlife. *Qualitative Health Research* 2001.

Meadows LM, Morse JM. Within project validation. Chapter 8 in Morse JM, Swanson J, Kuzel A. *The Nature of Qualitative Enquiry*. Thousand Oaks: Sage 2001.

Meadows LM, Thurston WE, Melton C. Immigrant women's health. *Social Science & Medicine*. 2001; 52(9): 1451-1458.

ARE WE BEATING CANCER?



THE OLD JOKE

among cancer researchers is that they've cured cancer thousands of times—in mice. But when it comes to ridding humans of the devastating illness, it's a far different story.

Nearly thirty years after the groundbreaking discovery of the first cancer-causing gene (called an oncogene), researchers have learned only to manage, not cure this leading killer of both women and men.

It's not for lack of trying. Over the past 25 years in Alberta and across the world, there has been an explosion in research activity that has led to an increased understanding of the cellular, molecular, and genetic bases for many types of cancer, thanks to the identification of oncogenes, which accelerate cancer's growth, and the more recent discovery of tumour-suppressor genes, which slow it. Scientists have gained better insight into how abnormal cells in the body grow uncontrollably and form cancerous tumours.

Tumour-suppressor genes control the tendency of cells to die when they are damaged. If the cells survive, they might start to grow again—an abnormal characteristic for mature cells, but a common feature of cancer cells. Another function of tumour-suppressor genes is to repair damaged DNA. When that repair fails, cell mutations increase. This accounts for cancer's astonishing ability to grow and resist almost anything scientists throw at it, says Dr. Randy Johnston, Director of the Southern Alberta Cancer Research Centre in Calgary. "Murphy's Law seems to apply in the development of cancer," he says. "Anything that could go wrong does go wrong."

Page 10 ▸

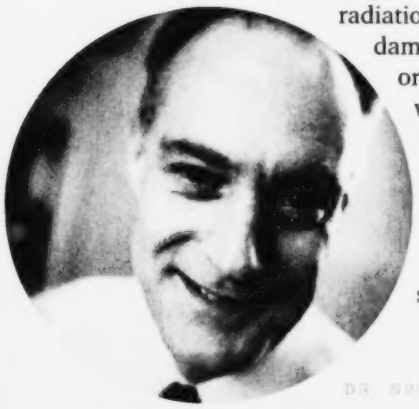
"AN EXPLOSION OF RESEARCH ACTIVITY HAS INCREASED OUR UNDERSTANDING OF THE MANY TYPES OF CANCER."

Catching up with knowledge

While the breadth and depth of knowledge about cancer is rapidly increasing, advances in cancer treatments have been fewer and slower, says Dr. Brent Zanke, Director of the Cross Cancer Institute in Edmonton. "A lot of the therapies being offered essentially have not changed over the last two decades. There are some new drugs that have changed the way that we're treating cancer," he notes. "New radiation techniques are also being developed, but we haven't seen a massive overhaul of cancer therapy."

A recently announced $21-million addition to the Cross Cancer Institute will help address this concern, Dr. Zanke says. The addition will house new world class technology that will improve cancer diagnosis and treatment allowing, for example, the delivery of higher doses of tumour-killing radiation than ever before, and with unprecedented accuracy.

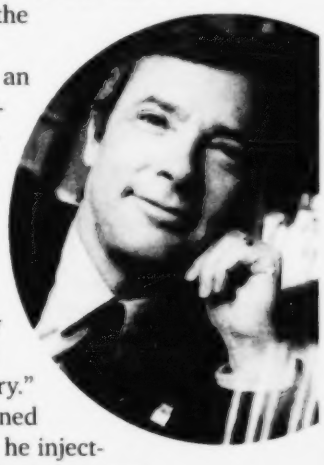
Surgery is the oldest form of cancer treatment. It ranges from biopsies confirming a cancer diagnosis to tumour removal aimed at preventing the disease from spreading. Other treatment options include radiation therapy, which destroys or damages cancer cells with X-rays or gamma rays; chemotherapy, which kills cancer with strong drugs; hormone therapy, which attacks the cancer with hormones; and immunotherapy, which uses the body's own immune system to fight the disease.



DR. BRENT ZANKE

Treatment horizon positive

As far as cancer drugs go, Dr. Johnston is encouraged that half of the clinical trials underway around the world represent new approaches to cancer therapy. Two of these innovative trials are based in Alberta. "We're excited about the advances happening through Biomira Inc., an Edmonton biotechnology company. They're conducting successful clinical trials on a vaccine for a virulent form of breast cancer," he says. "In Calgary, we're equally excited by Dr. Patrick Lee's reovirus discovery."

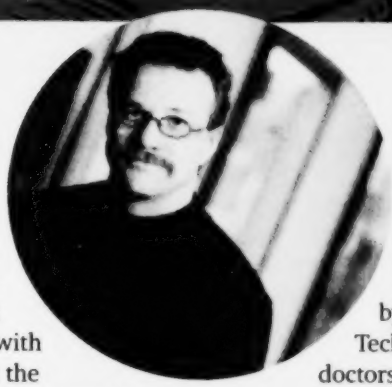


ABOVE: DR. RANDY JOHNSTON

Dr. Lee recently gained world attention when he injected live reovirus into cancer tumours, causing the virus to replicate and kill the cancerous cells. The process appears to be highly effective against 80% of cancers. Oncolytics Biotech Inc. of Calgary is currently testing reovirus in clinical trials.

Innovation key to advancement

University of Calgary cancer researcher Dr. Stephen Robbins says that serendipitous findings like the reovirus will be instrumental in the ultimate eradication of cancer. "It may be too bold to say, but I think classical approaches to cancer are not working that



DR. STEPHEN ROBBINS

effectively," he comments. "Surgeons can do as much as they can do. We're improving our chemotherapy and radiation techniques, but I think we're at the point now where we have to start with more innovative thinking. At the University of Calgary and other research institutions we're starting to integrate ideas from other disciplines into a really comprehensive understanding of cancer." Given the Heritage Foundation's continued recruitment of top researchers, access to new technologies, and the comprehensive cancer data registries available through the Alberta Cancer Board, Dr. Robbins says the province's scientists are poised to make enormous progress.

His own research on signal transduction (how cells communicate with each other) looks at the intricate biochemical circuitry that connects the outside of the cell to the inside of the cell. "We work on many proteins that are involved in telling the cell to divide, move somewhere, or become a particular kind of cell," Dr. Robbins explains. "We want to know how a particular cell decodes that signal." By better understanding how cells communicate with each other, researchers could pinpoint potential targets for cancer drugs to make them more effective against the disease.

Dr. Robbins started his career working as a postdoctoral fellow in the lab of Nobel Prize winner Dr. J. Michael Bishop. Dr. Bishop won the prestigious award for his discovery that oncogenes are actually a mutation of normal cell genes.

Slicing through genes

In collaboration with Heritage researcher Dr. Max Coppes, Dr. Robbins is also studying the molecular genetics of cancer in children. "Children with cancer are treated very differently than adults with the disease," he explains. "Because these cancers present themselves so early we believe there must be a heavily genetic component to them." The researchers are working on molecular profiling of pediatric cancers in order to better understand the genes involved in these types of tumours. The new gene chip technology will aid them in this research.

Gene chip technology allows a scientist to look at a "snapshot" of DNA that is so precise it can show how active a gene is and any mutations it carries. It's a revolutionary technique that will speed up the job of analyzing tumours immeasurably. Photonics Research Ontario, a provincial Centre of Excellence funded by the Ministry of Energy, Science and Technology, predicts that within a decade doctors will be using gene chip scanners in their offices to accurately diagnose such common health problems as a cold or the flu. They will be able to identify which gene is causing the problem and whether or not it is resistant to specific antibiotics.

The University of Calgary is establishing a state-of-the-art gene chip facility that will become operational this spring. Dr. Robbins predicts this shared provincial asset, in combination with other home-grown resources, will help Alberta researchers make improved cancer diagnoses and treatments.

Beyond DNA

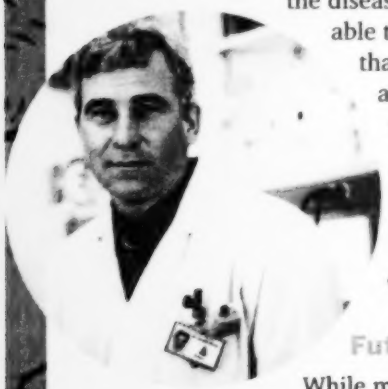
Another new cancer fighting technology already in use at the Cross Cancer Institute is PDT (photodynamic therapy). PDT uses light to activate photosensitizer drugs that target cancer cells, to identify and then zap tumours. This minimally invasive therapy is proving highly effective against bladder cancer, but its clinical application is currently limited because of side effects. Dr. Ron Moore, a Heritage researcher and noted urological surgeon (oncology and transplantation) based at the University of Alberta, has been working on strategies to overcome these limitations. Dr. Moore is also taking part in a successful collaboration with Dr. Lee to treat bladder cancer with the Calgary researcher's reovirus. Potentially, 50% to 70% of bladder cancers should respond to reovirus therapy. In animal testing, Dr. Moore's lab has observed cure levels greater than 70%, with no complications. Clinical studies are now being planned. **Page 12 ▸**

"OUR POPULATION IS INCREASINGLY AGING AND THE OVERALL INCIDENCE OF CANCER IS RISING."

A NEW, $21-MILLION ADDITION TO THE CROSS CANCER INSTITUTE WILL HOUSE WORLD-CLASS TECHNOLOGY THAT WILL IMPROVE CANCER DIAGNOSIS AND TREATMENT.

PDT is also being used clinically to treat lung, brain, and gastrointestinal cancers at other institutions. At present, Dr. Moore and colleague Dr. John Tulip are attempting to improve the accuracy of the treatment for prostate cancer.

Discussing the prospect of an imminent cure for cancer, Dr. Moore suggests that researchers are making great strides in understanding what causes the disease. Whether they will ever be able to devise a simple treatment that is affordable and readily available to everyone is still an unanswered question, he says. "The ideal cancer therapy would be selective for the disease, be minimally invasive, and have few side effects."



Future challenges

While much progress is being made, researchers and doctors are facing the immense challenge of translating laboratory wonders into therapies and treatments for patients. "Our population is increasingly aging," notes Dr. Zanke. "And the overall incidence of cancer is rising." The World Health Organization (WHO) projects that by 2015, 15 million people will develop cancer annually. Closer to home, Health Canada predicts that by 2010, 105,000 Canadians will die of the disease every year. Estimates are that in 15 years, 70% more Albertans will be living with cancer than today—a staggering thought, although Dr. Zanke can see a positive aspect: "More people are living with cancer because the cancer therapies we're using are working better."

Nonetheless, if these predictions come true, strong research will be more important than ever. "The strain on the healthcare system is going to be considerable," says Dr. Zanke. "We have to focus our research efforts on trying to relieve that strain in a cost-effective way. It's going to be through research that we'll make true advances."

Dr. Randall Johnston is the Director of the Southern Alberta Cancer Research Centre, the Associate Director (Research) of the Tom Baker Cancer Centre, and the Terry Fox Professor for Cancer Research. He is also the Associate Vice- President (Research) for the University of Calgary. Dr. Johnston receives support from the National Cancer Institute of Canada and the Alberta Cancer Board.

Dr. Ron Moore is a Heritage Scholar and an Associate Professor in the Division of Surgical Oncology in the Faculty of Medicine and Dentistry at the University of Alberta. He receives additional funding from the Alberta Cancer Board and the National Cancer Institute of Canada.

Dr. Stephen Robbins is a Heritage Scholar and an Assistant Professor in the Department of Oncology and the Department of Biochemistry and Molecular Biology in the Faculty of Medicine at the University of Calgary. He holds a Canada Research Chair in Cancer Biology. Dr. Robbins receives additional support from the Canadian Institutes of Health Research (CIHR), Cancer Research Society Inc., and the Alberta Cancer Board.

Dr. Brent Zanke is the new Director of Edmonton's Cross Cancer Institute. He receives support for his research from the Leukemia Research Foundation and the Canadian Institutes of Health Research.

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PROVIDING COMPREHENSIVE CARE

THE EDMONTON REGION is home to one of the most successful regional palliative care programs in the country. Recently cited in the Senate's report, Quality of End-of-Life Care: The Right of Every Canadian (June 2000), the Edmonton Regional Palliative Care Program provides palliative care support to about 90% of terminal cancer patients in this region. Most programs across Canada can offer only about 20% of cancer patients access to this type of care.

As Dr. Robin Fainsinger, Clinical Director of the Edmonton Regional Palliative Care Program, points out: "Our program is unique because it's a truly comprehensive program that gives patients access to care anywhere from their homes to the intensive care units of regional hospitals at some point during their illness."

Palliative care focuses on helping the terminally ill to manage their pain and other symptoms, and to enhance the quality of their lives by providing them with psychological and spiritual support through to the end of their lives. An interdisciplinary team which includes doctors and nurses, social workers, rehabilitation staff, chaplains, and dietitians provides support to Edmonton-area patients, whether they occupy palliative-care beds or chose to spend their last days at home.

Since it evolved during the health care cuts of the mid-1990's, the Edmonton program has improved access to care by nearly 70%. "We have shown that before the program was developed, 80% of cancer patients died in acute care and were using 22,000 hospital beds a year. Through the program, that figure has decreased to 50%, with the number of hospital beds cut to 6700 per year," Dr. Fainsinger notes. "What this means is that patients are receiving comprehensive palliative care in a more appropriate setting at much less cost."

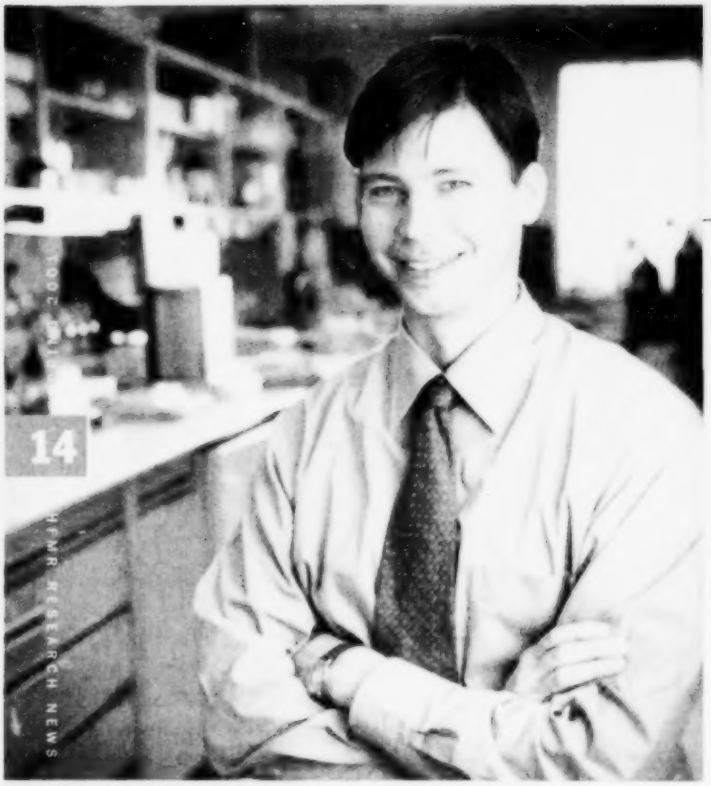
A study now underway will evaluate whether the change to a regional program has resulted in economic savings for the health region. "There are many complex layers of cost to consider: not just hospital stays, but the cost of the physician and the interdisciplinary support team, the cost of providing home- care, and the costs paid by families taking care of patients at home," says Dr. Fainsinger. The research team, with Dr. Fainsinger as principal investigator, will compare the cost of providing care in the periods before and after the program began. To get a better reading on the economic picture in Alberta during those times, these numbers will be compared to the cost of palliative care for patients in Calgary (which had no similar program in place).

"It would be an advantage if we could show a cost savings," Dr. Fainsinger comments. "But even if it is cost-neutral, it will be an advantage, because we're looking after these patients with appropriate care in a more comprehensive way."

Dr. Robin Fainsinger is an Associate Professor in the Department of Oncology in the Faculty of Medicine and Dentistry at the University of Alberta. He is also Director of the Division of Palliative Care Medicine, the Clinical Director of the Edmonton Regional Palliative Care Program, and the Interim Director of the Alberta Cancer Board provincial Palliative Care Network Initiative. *Dr. Fainsinger is supported through AHFMR's Opportunity Fund. He receives additional funding from the Alberta Cancer Board and the Royal Alexandra Hospital Foundation.*

Recent publications

Fainsinger RL, deMoissac D, Cole J, Mead-Wood K, Lee E. Home versus hospice inpatient care: Discharge characteristics of palliative care patients in an acute care hospital. *Journal of Palliative Care* 2000; 16(1): 29-34.



Staking new

If there's any question about the motivation for Heritage Scholar Dr. Timothy Kieffer's research, one needs only to look as far as his bulletin board. Posted there is a letter from a mother, asking whether Dr. Kieffer's discoveries are available now to help her three-year-old son, who is diabetic.

And that's only one of many letters, e-mails, and calls that Dr. Kieffer has fielded since he and his colleagues at the University of Alberta announced they had successfully engineered gastrointestinal cells of mice to produce insulin, the hormone that helps sugars from food get into the cells of the body to provide energy. The results were published in the December issue of *Science*, one of the world's top research journals.

It's groundbreaking work for two reasons. First, these intestinal cells take over the job of the regular, insulin-producing beta cells in the pancreas, which in diabetes are either destroyed or produce inadequate amounts of insulin. The second point is equally important: the cells release insulin at precisely the moment it's needed to manage blood sugar levels–during a meal. This is an obstacle that gene therapy researchers around the world have been trying to overcome for years.

"Our success attracted a lot of media attention and we've been very careful to emphasize that our work is basic science," adds Dr. Kieffer. "We've done something important in mice, for sure, but there's still a long way to go before we can make it work in humans. Nonetheless, this is our goal."

Dr. Kieffer notes that people who have no experience with diabetes tend to underestimate its seriousness, thinking of diabetes as an illness that can be managed. Yes, insulin injections allow diabetics to live with their disease but they do not prevent diabetes' serious complications such as kidney disease, nerve damage and amputations, blindness, and heart disease and stroke. More than 2 million Canadians have diabetes, making it the leading cause of death by disease in this country.

"Banting, Best, Collip, and Macleod (the Canadian team who discovered insulin) did their work 80 years ago," continues Kieffer. "Now, given how much more we understand about diabetes at a molecular level, there must be a better way to control this disease."

Putting gene therapy to work

Gene therapy holds a great deal of promise for diseases like diabetes, and is an active area of research around the world. It sounds relatively straightforward. To get around the fact that the insulin-producing beta cells in the pancreas are destroyed by diabetes, you simply take the genes that direct cells to make insulin and insert them into different cells which will then take over the job of the beta cells. Problem solved? Not quite. It's not enough to simply produce insulin; it must be produced at the right time to maintain normal blood-sugar levels. Thus, cells that receive the insulin gene must be able not only to make insulin, but also to regulate it. This has been a major stumbling block in gene therapy research.

Recognizing this problem, Dr. Kieffer's research team turned its attention to a group of cells that are naturally meal-responsive. The K cells lining the upper part of the small intestine sense when food is on its way down the digestive tract and produce a protein called GIP (glucose-dependent insulinotropic polypeptide).

ABOVE: DR. TIMOTHY KIEFFER

territory for insulin

That stimulates the pancreas to secrete insulin in anticipation of incoming sugar.

It's no coincidence that K cells were on the U of A team's radar. Both Dr. Kieffer and his colleague Dr. Anthony Cheung (lead author on the Science paper and a Heritage Fellow) had conducted research at the University of British Columbia, where GIP was discovered.

Working on the hunch that K cells would be good replacements for the pancreatic beta cells, Dr. Kieffer's team injected the insulin gene, attached to a GIP promoter, into mouse embryos. This method resulted in the insulin gene being present in all the cells of the so-called transgenic mice. However, since only K cells "understand" the GIP promoter, the insulin gene was turned on only in K cells.

These intestinal cells can make insulin when regular insulin-producing beta cells in the pancreas are either destroyed or producing inadequate amounts of insulin in diabetes.

There followed spectacular results, reported around the world. The transgenic mice producing human insulin in the intestine were protected from developing diabetes, even when the pancreatic beta cells were removed. "Our experiments have proven that K cells already have the necessary machinery to make insulin and store it, ready to be released upon consumption of a meal," explains Dr. Kieffer.

Now the challenge is to make this work in people. Obviously the method used for getting the gene into K cells in mice—injecting embryos—is not suitable in humans. "So our next step is to design a way to deliver the gene directly to the K cells," adds Dr. Kieffer. The team is exploring two common methods of carrying genes into the cells: viruses and liposomes.

"We're optimistic that we won't have to develop an entirely new delivery system," says Dr. Kieffer. "But there's still a lot of work to do."

Dr. Kieffer has formed a company—enGene Inc.—with Dr. Cheung (who is the CEO) and Dr. John Brown, the UBC professor who discovered the target GIP cells and a co-founder of Canadian biotechnology company QLT Inc. AHFMR Technology Commercialization funding to support a patent application and business plan development will enable enGene to explore other funding avenues for its research.

Dr. Tim Kieffer is a Heritage Medical Scholar and an Assistant Professor in the Departments of Medicine and Physiology at the University of Alberta. He also receives funding from the Canadian Diabetes Association, Canadian Institutes for Health Research (CIHR), Juvenile Diabetes Research Foundation, and the Natural Sciences and Engineering Research Council (NSERC).

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Fear of down-time

Want to scare a young scientist? You only need one word: down-time. It refers to the time it takes to establish your own lab at a university, usually after completing a post-doctoral fellowship at another institution. In the health sciences, where research competition is fierce and publications are absolutely necessary to ensure that research grants keep coming, a period of not doing any research can stunt a promising career.

"We're all afraid of this," says Heritage Scholar Dr. Timothy Kieffer, who came to the University of Alberta from Harvard Medical School in 1998. "If you don't keep working, you'll get left in the wake of more senior, established scientists. Their labs keep going while you're spinning your wheels trying to get set up."

Given this, why did Dr. Kieffer come to Alberta when he was offered a faculty position at Harvard? Well, there are a number of reasons, but one thing he didn't have to worry about was down-time.

Armed with an establishment grant from the Heritage Foundation, along with his Heritage Scholar salary award, Dr. Kieffer was able to get his lab set up, purchase equipment and hire technicians even before he moved from Boston.

"The Heritage Foundation gets most of the credit for me being here," he says. "Start-up packages like this generally don't exist elsewhere in Canada. My colleagues in the US get about a half-million dollars to get their labs started. Canadian universities might offer 10% of that. Heritage made the difference."

CYTOVAX BIOTECHNOLOGIES INC.

TECHNOLOGY TO KEEP

Looking back on those two weeks in January 2001, Dr. Bin Huang wonders how she survived. That was when Huang, President and CEO of Edmonton-based Cytovax Biotechnologies Inc., presented the company's Initial Public Offering (IPO) to fund managers, brokers, and investors. She had over 40 meetings during the two-week period. "On one day alone, I made presentations at nine meetings," Huang recalls. **"It was absolutely gruelling."**

But the hard work paid off as investors warmed to her pitch and saw potential in the company. When asked, "You're a small company in Edmonton—why do you think your technology is unique?" Huang had all the answers, and a compelling story, to boot. The IPO was completed in February, raising $10 million. Cytovax is now traded on the Toronto Stock Exchange.

"The IPO is a significant milestone for our company," says Huang. Combining the IPO with approximately $8 million from a special warrants issue, Cytovax now has $18 million to start Phase 1 trials of its lead product, Cytovaxine. It represents a novel approach to fighting bacterial infections. Cytovax's proprietary technology does not work like many anti-infectives, such as antibiotics, which are designed to kill bacteria. The vaccines and therapeutics based on Cytovax's technology block the interaction between bacteria and their host cells to prevent the infection process. As a result, the technology has the potential to be a key weapon in the fight against antibiotic-resistant bacteria.

The technology has its roots in the pioneering work on synthetic peptides done by Dr. Robert Hodges, a biochemistry professor at the University of Alberta. Hodges saw potential in using peptides (small molecules made up of amino acids linked together) as drugs. In 1986, AHFMR's Technology Commercialization (TC) Program supported Hodges as he investigated the feasibility of commercializing his research. A company, Synthetic Peptides Inc., was subsequently established. By 1991, Synthetic Peptides had moved the technology further along, and a project to test a synthetic peptide vaccine was also supported by the TC Program.

"Heritage funding was critical in the early stages of the development of the technology and the genesis of Synthetic Peptides (SPI)," says Huang. "Drug development is a very lengthy and costly process. Without the early infusion of cash to keep development going within SPI, it could be that Cytovax would not exist today."

Cytovax was created in 1998 through the amalgamation of SPI and another Edmonton biotechnology company, Biotex Laboratories Inc. Biotex had two commercial products, and revenues from their sales were used to fund continuing research and development on the vaccine.

RIGHT: DR. BIN HUANG

BACTERIA AT BAY

"It was important to have a source of revenue, however it wasn't enough to fund the R&D completely, especially as we began to approach the clinical trial stage," notes Huang. "This was when we began to look for venture capital, followed by a private placement and, finally, the IPO. I guess you could say this is pretty close to the 'traditional' approach to commercialization."

Partnering has also figured prominently in Cytovax's evolution. In June 2000, the company entered into an agreement with Canadian biotech giant BioChem Pharma Inc., which made a $2 million investment in Cytovax. In return it received a worldwide exclusive license to manufacture and market Cytovaxine, as well as licensing options on three other products. In addition to the funding, Cytovax gains access to the larger company's considerable expertise in manufacturing, clinical trials, and marketing.

Having secured sufficient funding for the next two to three years, Huang says the focus is on moving the products along. The Cytovax R&D team now numbers 18 people; total staff is 26.

"Typically the drug development process takes about 12 years. I'd say we're somewhere in the middle," continues Huang. "For our lead product Cytovaxine, we've done the research, designed the compound, and completed animal testing. We anticipate beginning Phase 1 clinical trials later on this year. Other products are also in the pipeline.

"Although drug development notoriously takes a long time, Cytovax intends to be proactive in the process. There's a driving need to compress the timeline, to make sure we have the management structure to make decisions quickly. Time is of the essence."

In addition to funding from AHFMR's Technology Commercialization Program to support product development, the basic-research labs of Dr. Hodges have received Heritage support through grants for training, equipment, and other purposes.

Superbugs: NOT SO SUPER ANYMORE

When Dr. Bin Huang makes presentations to investors about her company Cytovax Biotechnologies Inc., it is always talk of "superbugs" that catches their attention.

"People have heard a lot about antibiotic resistant bacteria, the so-called superbugs," says Huang, Cytovax's CEO. "These bacteria are causing progressively more infections in hospitals. They not only drive up the cost and length of hospitalization, they make people who are already sick much sicker and in some instances the infections kill people." It has been estimated that in 1995 hospital-acquired infections in the United States cost $4.5 billion and contributed to more than 88,000 deaths. The problem has only worsened in the past several years, leading to quarantines and closures of entire nursing units.

The increasing ability of bacteria to resist antibiotic therapy creates tremendous potential for Cytovax. The Cytovax technology blocks the infection process without killing the bacteria directly, as antibiotics typically do. So it works even if the bacteria are resistant to antibiotics.

How does it work? Certain bacteria have extensions called *pili*; at the tip of each *pilus* is an "adhesin", which binds directly to a receptor site on a human cell—similar to a lock and key. Once the key is inserted in the lock, infection occurs. Cytovax vaccines and therapeutics interfere with the binding process thus blocking infection. The company calls this Anti-Adhesion Platform Technology (AAPT).

Cytovaxine, the lead product, works against *Pseudomonas aeruginosa*, the most common cause of hospital-acquired infections. High-risk groups for *P. aeruginosa* infection are people with cystic fibrosis, cancer, and AIDS, as well as patients in intensive-care units, transplant patients, and burn victims.

Cytovax's second target is *Streptococcus pneumonia*. Each year, Americans make nearly 30 million visits to doctors for earaches, half of which are caused by *S. pneumoniae*. Data show that the resistance of bacterium to antibiotics is approaching 50% in the United States. Cytovax is working on a product that prevents *S. pneumoniae* infection, and preclinical development is expected to begin in late 2002.

Making sense of making babies

ETHICS AND NEW REPRODUCTIVE TECHNOLOGIES

We've had about 20 years to be "wowed" by the milestones of reproductive technology. Test-tube babies. Sperm and egg donations. Pregnancy at the age of 62. The woman who carries her daughter's child, thus giving birth to a child who is both her son and grandson. At a time when there's a lot of excitement over the potential of these new technologies, a voice in Alberta is saying something quite different.

"Slow down and think," says University of Alberta bioethicist Dr. Laura Shanner. "For thousands of years, the woman who gave birth to a baby was unquestionably the child's mother. It's only in the last 20 years that this relationship has not always held true. And we don't know how to handle the implications. How do the new genetic and gestational relationships made possible by reproductive technology affect the child?"

If a child is born to a surrogate mother, or is conceived as the result of an egg or sperm donation, who are really the parents? Does it come down only to who paid for the procedure or who is married to the father? It's not at all clear, legally or socially.

"Assisted reproduction is all about causing someone to come into the world," says Dr. Shanner. "There's an enormous responsibility here. The moral weight of choosing to bring someone into existence is a very important area for ethics.

"In the case of surrogates and egg or sperm donors, is it really acceptable not to have any responsibility toward the child you've helped create? We have problems with natural parents who have children and then don't look after them. Is this situation different?"

For Dr. Shanner, the overriding concern is not the legal technicalities, but the welfare of children and families. "The question is how to help children to have a strong, secure sense of self in these convoluted relationships. We don't know the answer."

This is not to doubt the intentions of the people involved in these arrangements, she notes. "Infertility causes an incredible amount of pain and suffering. The people involved are motivated by a desire to do good. The goal is to get the baby. However, from the child's point of view that's not the end point, it's only the beginning. There are issues of family dynamics, development of social identity, secrecy. How is the child going to be affected?

"We don't have the social or the conceptual framework even to talk about these things. These are profound issues, and we're messing with them as if they don't matter."

But there's a wider issue here, beyond reproductive technology. Dr. Shanner's work on the ethical

implications in assisted reproduction has led her to contemplate the role of technology, and especially healthcare technology, on a global scale.

To her, the main issue is fairness. Given the reality that we can't do everything for everybody, whose problems get solved? "The inclination may be to say 'me first', and I understand that because I do it myself. But when I put my ethical lens on, I have to look at things from a global perspective.

"Much of the world would be happy to be facing some of the issues that are debated in wealthy nations–reproductive technology, genetic technology, and life extension. Entire societies are on the verge of collapse because of AIDS. There are countries where people have virtually no access to antibiotics and vaccines. How can we sit back and say this is fair?"

Even if we accept this reality, Dr. Shanner says we still have to ask ourselves if we should focus so much effort on technological "fixes".

"We spend hundreds of millions of dollars every year (globally) on in vitro fertilization, treating women with drugs and surgery to circumvent infertility. Yet we do close to nothing to prevent people from becoming infertile. Men's sperm counts are dropping and we don't know why. There may be links to environmental chemicals and food additives. Why is this not a burning issue? I'm struck by our illogical choices. Wouldn't it be better to reduce the need for these technologies?

"So far we've been lucky to find technological solutions to many of the things we want. I'm not saying technology is bad. I'm saying that it has its limits and costs, and not everyone benefits."

Dr. Laura Shanner is a Heritage Population Health Investigator. Her research is also supported by an Independent Establishment Grant from AHFMR, the Canadian Institutes of Health Research (CIHR), and the Social Sciences and Humanities Research Council (SSHRC).

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RIGHT: DR. LAURA SHANNER

Understanding a cancer gene

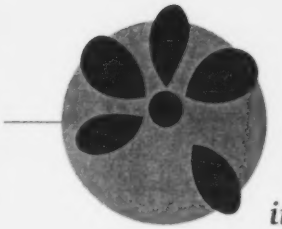
"I learn the most in a competitive environment where I can ask a lot of questions," says Rebecca, whose studies are supported by an AHFMR Studentship. "At the U of C, you have access to so many resources, as well as the opportunity to participate in a diverse research environment. And everybody here is really happy to help you."

Rebecca describes her work as "madly chiselling away at ING1 gene expression to see what happens."

After a six-month rotation, exploring her options in three different labs, Rebecca found her niche with Heritage Scientist Dr. Karl Riabowol of the U of C Faculty of Medicine's Cancer Biology Research Group. She is concentrating her efforts on a candidate tumour-suppressor gene known as ING1, which Dr. Riabowol and his colleague, Igor Garkavtsev, identified in breast cancer cells in the mid-1990s.

Studies have shown that ING1 is expressed abnormally in some cancers– including breast, gastric, and lymphoid cancers–but its behaviour is unpredictable. Evidence suggests that ING1 may repress gene transcription in some cases, "switching off" genes and preventing them from being expressed; in other cases, it seems to enhance transcription. In most breast cancer cells, for example, ING1 appears to have been "turned down," which means the cancer cells are somehow acting to diminish the effectiveness of a gene that would normally inhibit their growth. Evidence also indicates that ING1 is involved in apoptosis (cell death), another critical factor in cancer.

Rebecca describes her work as "madly chiselling away at ING1 gene expression to see what happens." Her "chisel" is leading-edge technology: a technique known as DNA micro array



"With this technology we can have information in weeks that it would probably have taken years to get before!"

testing and highly sophisticated "gene chips" that allow her to look at up to 19,000 genes in a single experiment. With the gene chips, she can "switch on" ING1 in breast cancer cells, then observe the response in other genes to see whether they are enhanced or repressed as a result.

"With this technology we can have information in weeks that it would probably have taken years to get before!" she says. "There are many places where you'd have to wait in line to use this technology. Here, it's right at our fingertips." She is very grateful to Dr. Doug Demetrick, who made the gene chip studies possible. "Without him," she says, "the most exciting part of my project would not have happened!"

Having always been fascinated by human medicine, the trained lifeguard and aerobics instructor hopes to follow up her graduate studies with a medical degree. For the time being, she is excited to be part of Dr. Riabowol's team as they explore the potential of ING1. "Human medicine is what I love," says Rebecca, "both the research and the clinical components. I want to include them both in my career."

Rebecca Nelson is an AHFMR student working in the lab of Heritage Scientist Dr. Karl Riabowol of the Cancer Biology Research Group in the Faculty of Medicine at the University of Calgary. Dr. Doug Demetrick is an Associate Professor in the Departments of Pathology and Laboratory Medicine; Oncology; and Biochemistry and Molecular Biology

reader resources

Are we beating cancer?

Alberta Cancer Board
www.cancerboard.ab.ca

Canadian Cancer Society
www.cancer.ab.ca

Northern Alberta Breast Cancer Program
www.albertabreast.com/index.html

Cytovax Biotechnologies Inc.

Cytovax web site: www.cytovax.com

Staking new territory for insulin

Canadian Diabetes Association
www.diabetes.ca

Juvenile Diabetes Foundation International
www.jdf.org

American Diabetes Association
www.diabetes.org

Health Canada web site (Seniors)
www.hc-sc.gc.ca/english/azindex_stu.htm#senrs

Taking the Measure of Women's Health at Midlife

Health Canada (Women's Health)
www.hcsc.gc.ca/english/azindex_vwxyz.htm#women

Providing Comprehensive Care

Edmonton Regional Palliative Care Program
www.palliative.org

Making sense of making babies

University of Alberta, Health Law Institute
www.law.ualberta.ca/centres/hli/

erratum

Dr. Redwan Moqbel was incorrectly identified in the Winter 2001 AHFMR Research News as an Associate Professor. In fact, Dr. Moqbel is a full Professor of Pulmonary Medicine in the Faculty of Medicine and Dentistry at the University of Alberta.

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Cytovax Biotechnologies Inc.

Cytovax web site: www.cytovax.com

Staking new territory for insulin

Canadian Diabetes Association
www.diabetes.ca

Juvenile Diabetes Foundation International
www.jdf.org

American Diabetes Association
www.diabetes.org

Health Canada web site (Seniors)
www.hc-sc.gc.ca/english/azindex_stu.htm#senrs

Taking the Measure of Women's Health at Midlife

Health Canada (Women's Health)
www.hcsc.gc.ca/english/azindex_vwxyz.htm#women

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$53 million awarded for AHFMR research

Dr. Bleackley is one of 63 scientists who were offered a total of $53 million in funding through this year's competition. Applications for the Senior Personnel Awards are reviewed by approximately 500 scientists all over the world before being ranked by a scientific advisory committee and presented to AHFMR's Board of Trustees for approval. The process is rigorous and the competition world-class, so only the best applicants are offered funding. This is one of the main reasons that Albertans can pride themselves on having a provincial community of biomedical and health researchers that is second to none.

DR. CHRIS BLEACKLEY

This year's funding marks several firsts: the most applicants offered funding, the most money awarded, and, if all the awards are taken up on July 1, a 20% increase in the number of Heritage researchers for a provincial total of 235 in 15 different faculties at the three research universities.

The unique support offered through Heritage also plays a major part in attracting to our province bright young researchers-in-training through to top-level scientists. Dr. Robert Sutherland, offered an AHFMR Scientist award, will be coming from New Mexico to the University of Lethbridge to become a key member of that institution's world-renowned neuropsychology group. At the University of Calgary, Drs. Rebekah DeVinney from Vancouver and Tara Beattie from Toronto exemplify the young investigators starting on their career paths.

AHFMR's cumulative investment of more than $650 million over the past two decades in biomedical and health research excellence is resulting in new knowledge, new technologies, and major advances in health. Initial AHFMR investment in basic research 20 years ago was critical to last year's breakthrough in diabetes therapy made by the Edmonton Protocol team at the University of Alberta. Similar long-term Heritage investment led to discoveries in diabetes by colleagues Ji-Won Yoon and Pere Santamaria at the University of Calgary.

For top researchers like Chris Bleackley, the Alberta Heritage Foundation for Medical Research plays a critical part in the decision to remain in Alberta. "Heritage support includes funds for recruitment of students and post-doctoral fellows which is the lifeblood of my research. AHFMR makes Alberta one of the best places in the world to work."

Information:

For a listing of Year 2001 AHFMR Senior Personnel Award winners, please go to the AHFMR Web site at: http://www.ahfmr.ab.ca/press/2001awards.shtml

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Dr. Chris Bleackley's pioneering work into the function of the killer T cells that are part of our immune system led to international headlines five years ago. Last year, his research on the protein trigger that allows certain cancer cells to evade death from T cells led again to international headlines and, more importantly, to a better understanding of cancer. Dr. Bleackley has been Heritage-funded for 20 years including the renewal of a five-year Scientist Award in the recent AHFMR Biomedical and Health Senior Personnel Awards competition.

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